WFBMC ENVIRONMENTAL HEALTH & SAFETY / ENGINEERING			
WFBMC ARC FLASH PROGRAM			
Approved by:		*Effective Date:*	March 2008
David A. Brown, Director, WFBMC EH&S		*Revised Date:*	July 2012
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I. INTRODUCTION

POLICY

This policy is intended to protect Wake Forest Baptist Medical Center (WFBMC) Employees from injury due to electrical shock, burns, arc blast/arc flash, electrocution, or other related injuries. This policy establishes the minimum requirements to protect employees from such hazards.

PURPOSE

WFBMC is dedicated to providing safe work facilities for Faculty, staff and students and employees, and complying with health and safety standards.

SCOPE

Arc Flash Program applies to working on live equipment greater than 50 volts.

II. DEFINITIONS

Arc-flash burns - An electric arc flash can occur if a conductive object gets too close to a high-amp current source or by equipment failure (for instance, while opening or closing disconnects). The arc can heat the air to temperatures as high as 35,000 F, and vaporize metal in the equipment. The arc flash can cause severe skin burns by direct heat exposure and by igniting clothing.

Arc-blast impacts - The heating of the air and vaporization of metal creates a pressure wave that can damage hearing and cause memory loss (from concussion) and other injuries. Flying metal parts are also a hazard.

Arc rating - The maximum incident energy resistance demonstrated by a material (or a layered system of materials) prior to “breaking open” or at the onset of a second-degree skin burn. This rating is assigned to electrical protective clothing and is normally expressed in calories per square centimeter (cal/cm^2).

Electric shock and burns - An electric shock occurs when electric current passes through your body. This can happen when you touch an energized part. If the electric current passes across the chest or head, you can be killed. At high voltages, severe burns can result.

Flash hazard analysis - A study to investigate a worker’s potential exposure to arc-flash energy, conducted for the purpose of injury prevention and the determination of safe work practices along with appropriate levels of PPE.

Flash protection boundary - An approach limit at a distance from exposed live parts within which a person could receive a second-degree burn if an electrical arc flash were to occur.

Flash suit - A complete FR clothing and equipment system that covers the entire body, except for the hands and feet. (Such a suit typically includes pants, jacket, and a “bee-keeper” style hood fitted with a face shield).

FR apparel - Flame-resistant apparel; describes a broad category of clothing designed to protect employees from electrical arc events during completion of energized tasks.

Incident energy - The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. One of the units used to measure incident energy is calories per square centimeter (cal/cm^2).

Limited approach boundary - An approach limit at a distance from an exposed live part within which a shock hazard exists.

Live parts - Energized conductive components.

Prohibited approach boundary - An approach limit at a distance from an exposed live part within which work is considered the same as making contact with the live part.

PPE - An acronym for “Personal Protective Equipment”.

Qualified person - One who has skills and knowledge related to the construction and operation of the electrical equipment and installation and has received training on the hazards involved.

Restricted approach boundary - An approach limit at a distance from an exposed live part within which there is an increased risk of shock (due to electrical arc-over combined with inadvertent movement) for personnel working in close proximity to the live parts.

Unqualified person - Any person who does not meet the definition of a qualified person.

Working near (live parts) - Any activity within a Limited Approach Boundary.

Working on (live parts) - Coming in contact with live parts via tools, probes, test equipment, hands, feet, or other body parts regardless of the level of PPE worn.

III. REGULATORY OVERVIEW

The following regulations pertain to arc flash.

FEDERAL REGULATION	TITLE
OSHA 29 CFR 1910.147	Control of Hazardous Energy
OSHA 29 CFR Subpart S	Electrical
NEC	National Electrical Code
NFPA 70E, 2009 Edition	Standard for Electrical Safety in the Workplace

IV. ROLES AND RESPONSIBILITIES

WFBMC Environmental Health and Safety
- Assist in the developing and implementation of the Arc Flash Program.
- Review program annual with WFBMC Engineering.

WFBMC Engineering
- Implement the Arc Flash Program.
- Provide training to authorized employees.
- Provide PPE and insulated tools and equipment.

Authorized Employees
- Adhere to the requirements of the Arc Flash Program.
- Complete all safety training requirements.
- Report all workplace injuries, unsafe conditions and near misses to their supervisors and/or WFBMC EH&S.

Contractors
- Comply with the OSHA standard 1910.147, 1910 Subpart S which includes 1910.331 – 1910.335 and NFPA 70E.
- Whenever outside servicing personnel are to be engaged in electrical activities, WFBMC and the outside employer shall inform each other of their respective procedures.
- WFBMC Engineering shall ensure that WFBMC Employees understand and comply with the restrictions and prohibitions of the outside employer's electrical program.

V. LABELING

Any type of electrical equipment located at WFBMC will be labeled with the following label if subject to examination, adjustment, service or maintenance while energized to warn qualified persons of potential electrical arc flash hazards. This type of electrical equipment may include, but not limited to the following:

- Switchboards
- Panel boards
- Control Panels
- Meter socket enclosures
- Motor control centers

The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing or maintenance of the equipment.

VI. ALERTING TECHNIQUES

- Barricades shall be used in conjunction with safety signs to prevent or limit access to work areas containing live parts. Conductive barricades shall not be used where they might cause an electrical hazard. Barricades shall be placed no closer than the Limited Approach Boundary.
- Barricades, such as plastic fencing, must be in place if workers have to leave energized parts exposed over 600 volts.
- If signs and barricades do not provide sufficient protection, and attendant will be assigned to warn and protect pedestrians. The primary duty of the attendant shall be to keep unqualified persons out of the work area where an electrical hazard exists. The attendant shall remain in the area as long as there is a potential exposure to electrical hazards.

VII. WORKING ON OR NEAR LIVE CIRCUITS

Employees should not work on live equipment, greater than 50 volts except for two reasons:

1. De-energizing introduces additional or increased hazards, such as cutting ventilation to a hazardous location or
2. Infeasible due to equipment design or operational limitations, such as when voltage testing is required for diagnostics.

Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though working on de-energized parts. Common tasks where work on or near live circuits may include:

- Taking voltage measurements
- Opening and closing disconnects and breakers
- Racking breakers on and off the bus
- Removing panels and dead fronts

- Opening electric equipment doors for inspection.

There will be training for these common tasks included upon hire and annually. For instance, when opening and closing disconnects, use the **left-hand rule** when possible (stand to the right side of the equipment and operate the disconnect with your left hand).

For situations where work on or near live circuits may occur on systems equal to or greater than **480 volts**, WFBMC Director of Engineer or Engineer Supervisor must be notified and approve/authorize the live work.

VIII. LIVE WORK

A live work on systems equal to or greater than 480 volts, the WFBMC Director of Engineer or Engineer Supervisor will consider the following information before authorizing this work.

- A description of the circuit and equipment to be worked on and location
- Why live work will be done
- Determination of flash protection boundary
- PPE to be worn and description of safe work practices to be used
- Who will do the work and how unqualified persons will be kept away
- Evidence of completion of job briefing, including description of job-specific hazards (**APPENDIX A – JOB BRIEFING AND PLANNING CHECKLIST**).

IX. APPROACH BOUNDARIES

The National Fire Protection Association defines three approach distances for shock hazards and one for arc flash.

- **Limited Approach Boundary** (listed in **TABLE 1**)**:** Distance from an exposed live part within which a shock hazard exists. An unqualified person may not cross this boundary unless they are continuously escorted by a qualified person.

- **Restricted Approach Boundary** (listed in **TABLE 1**)**:** Distance from an exposed live part within which there is an increased risk of shock (due to electrical arc-over combined with inadvertent movement) for personnel working in close proximity to the live part. This boundary may only be crossed by a qualified person who is safely insulated or guarded from the live parts. To cross the restricted approach boundary, the qualified person must:
  - Have a documented plan that is approved by WFBMC Director of Engineer.
  - Use PPE suitable for working near exposed live parts and rated for the voltage and energy level involved.
  - Be certain that no part of the body enters the prohibited space.
  - Minimize the risk from unintended movement, by keeping as much of the body as possible out of the restricted space; body parts in the restricted space should be protected.

- **Prohibited Approach Boundary** (listed in **TABLE 1**)**:** Distance from an exposed live part within which work is considered the same as making contact with the live part. This boundary may only be crossed by a qualified person who has:
  - Specific training to work on energized parts.
  - Obtained an approved Live Work Permit.

- Uses PPE appropriate for working on energized parts which are rated for the voltage and energy level involved.

- **Arc Flash - Flash Protection Boundary** (not listed in **TABLE 1**): Distance from exposed live parts within which a person could receive a second-degree burn if an electrical arc flash were to occur. This boundary may only be crossed by a qualified person wearing the appropriate PPE.
  - For systems that are 600 volts or less the flash protection boundary is 4 feet, based on an available bolted fault current of 50 kA (kiloamps) and a clearing time of 6 cycles (0.1 seconds) for the circuit breaker to act, or any combination of fault currents and clearing times not exceeding 300 kA cycles.
  - When the part that is going to be worked on is de-energized, but is still inside the flash protection boundary for nearby live exposed parts: If the parts cannot be de-energized, barriers such as insulated blankets must be to protect against accidental contact or proper PPE must be worn.

TABLE 1 – APPROACH BOUNDARIES

Nominal System Voltage (phase to phase)	Limited Approach Boundary (fixed circuit parts)	Restricted Approach Boundary (includes inadvertent movement adder)	Prohibited Approach Boundary
Less than 50V	Not specified	Not specified	Not specified
50V to 300V	3 feet, 6 inches	Avoid contact	Avoid Contact
301V to 750V	3 feet, 6 inches	1 foot	1 inch
751V to 15 kV	5 feet	2 feet, 2 inches	7 inches

(All dimensions are distance from live part to employee)

X. PERSONAL PROTECTIVE EQUIPMENT

When working on or around live circuits, be sure to wear the right PPE to protect against electric shock and arc flash. Never wear clothing made from synthetic materials, such as acetate, nylon, polyester, or rayon - alone or combined with cotton. Such clothing is dangerous because it can burn and melt into your skin.

The minimum PPE required will be provided cotton (untreated natural fiber) long-sleeve coveralls with safety glasses with side shields (hazard/risk category 0).

General

- Employees working in areas where electrical hazards are present shall be provided with and use, protective equipment (Arc Flash Gear) that is designed and constructed for the specific body part to be protected and for the work to be performed.
- WFBMC will provide electrical protective equipment (Arc Flash Gear) required by this program at no cost to employees. Such equipment shall include an Arc Flash rated apparel, eye protection, head protection, hand protection, hard soled footwear and face shields where necessary.
- All protective equipment shall be maintained in a safe, reliable condition by the employee to whom it is issued.

- Employees shall wear nonconductive head protection whenever there is a danger of a head injury from electric shock or burns due to contact with live parts or from flying objects resulting from an electrical explosion.
- Employees shall wear nonconductive protection for the face, neck, and chin whenever there is danger of injury from exposure to electric arcs or flashes or from flying objects resulting from an electrical explosion.
- Employees shall wear protective equipment for the eyes and face whenever there is a danger of injury from electric arcs, flashes, or from flying objects resulting from an electrical explosion.
- Employees shall wear rubber-insulating gloves where there is a danger of hand and arm injury due to contact with live parts or possible exposure to arc flash burn.
- Employee shall wear hard-soled shoes (tennis shoes are not considered hard soled).
- Face shields without an arc rating will not be used for electrical work. Safety glasses or goggles must always be worn underneath face shields.
- Additional illumination may be needed when using tinted face shields as protection during electrical work.

Flame-Resistant Apparel & Under Layers

- Non-melting, flammable garments (i.e. cotton, wool, rayon, silk, or blends of these materials) may be used as under layers beneath FR apparel.
- Meltable fibers such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric under layers next to the skin. (An incidental amount of elastic used on non-melting fabric underwear or sock shall be permitted).
- FR apparel shall be visually inspected before each use.
    - FR apparel that is contaminated or damaged shall not be used.
    - Protective items that become contaminated with grease, oil, flammable liquids, or combustible liquids shall not be used.
- The garment manufacturer's instructions for care and maintenance of FR apparel shall be followed.
- When FR apparel is worn to protect an employee, it shall cover all ignitable clothing and allow for movement and visibility.
- FR apparel must cover potentially exposed areas as completely as possible.
    - FR shirtsleeves must be fastened and FR shirts/jackets must be closed at the neck.
- FR garments worn as outer layers over FR apparel (i.e. jackets or rainwear) must also be made from FR material.
- Flash suits must permit easy and rapid removal by the user.

The type of PPE worn depends on the type of electric work being done as referred to the **Hazard Risk Category Classification, TABLE 2.**

TABLE 2 - HAZARD RISK CATEGORY CLASSIFICATION

(WITHIN FLASH PROTECTION BOUNDARY)

For low-voltage tasks (600 volts and below), this table applies only when there is an available short-circuit capacity of 25 kA or less, and when the fault clearing time is 0.03 seconds (2 cycles) or less. For 600-volt-class motor control centers, a short-circuit current capacity of 65 kA or less and fault-clearing time of 0.33 seconds (20 cycles) is allowed. For 600-volt-class switchgear, you need a short-circuit current capacity of 65 kA or less and fault-clearing time of 1 second (60 cycles).

For tasks not covered in this table and tasks involving equipment with larger short-circuit current capacities or longer fault-clearing times, a qualified person must conduct a flash hazard analysis.

- V-rated Gloves are gloves rated and tested for the maximum line-to-line voltage upon which work will be done.
- V-rated Tools are tools that are rated and tested for the maximum line-to-line voltage upon which work will be done.
- Applying safety grounds after voltage testing does not require voltage-rated tools.

Voltage-rated gloves or tools are rated and tested for the maximum line-to-line voltage on which work will be done. The hazard/risk category may be reduced by one number for low-voltage equipment listed here where the short-circuit current available is less than 15 kA (less than 25 kA for 600-volt-class switchgear).

TABLE 2 - HAZARD RISK CATEGORY CLASSIFICATION

TASKS	HAZARD/RISK CATEGORY	V-RATED GLOVES	V-RATED TOOLS
Opening Doors and Covers, Opening hinged covers (to expose bare, energized parts)			
240 volts or less	0	NO	NO
600-volt-class motor control centers	1	NO	NO
600-volt-class lighting or small power transformers	1	NO	NO
600-volt-class switchgear (with power circuit breakers or fused switches)	2	NO	NO
Removing bolted covers (to expose bare, energized parts)			
240 volts or less	1	NO	NO
600-volt-class motor control centers or transformers	2*	NO	NO
600-volt-class lighting or small power transformers	2*	NO	NO
600-volt-class switchgear (with power circuit breakers or fused switches)	3	NO	NO
Installing, Removing or Operating Circuit Breakers (CBs), Fused Switches, Motor Starters or Fused Contactors			
Installing or removing circuit breakers or fused switches, 240 volts or less	1	YES	YES
Inserting or removing (racking) CBs from cubicles, doors closed			
600-volt-class switchgear (with power circuit breakers or fused switches)	2	NO	NO
Inserting or removing (racking) CBs or starters from cubicles, doors open			
600-volt-class switchgear (with power circuit breakers or fused switches)	3	NO	NO
Operating circuit breaker (CB), fused switch, motor starter or fused contactor, covers on/doors closed			
240 volts or less	0	NO	NO
>240-<600 volt panelboards/switchboards (molded case or insulated case CBs)	0	NO	NO
600 volt class motor control centers	0	NO	NO
600 volt class switchgear (with power circuit breakers or fused switches)	0	NO	NO
Operating circuit breaker, fused switch, motor starter or fused contactor, covers off/doors open			
240 volts or less	0	NO	NO
>240-<600 volt panelboards/switchboards (molded case or insulated case CBs)	1	NO	NO
600 volt class motor control centers	1	NO	NO
600 volt class switchgear (with power circuit breakers or fused switches)	1	NO	NO
Working on Energized Parts, voltage testing, applying safety grounds			
240 volts or less	1	YES	YES
>240-<600 volt panelboards/switchboards (molded case or insulated case CBs)	2*	YES	YES
600-volt-class motor control centers	2*	YES	YES
600-volt-class switchgear (with power circuit breakers or fused switches)	2*	YES	YES
600-volt-class lighting or small power transformers	2*	YES	YES
600-volt-class revenue meters	2*	YES	YES

TASKS	HAZARD/RISK CATEGORY	V-RATED GLOVES	V-RATED TOOLS
Working on control circuits with exposed energized parts, 120 volts or below			
600-volt-class motor control centers	0	YES	YES
600-volt-class switchgear (with power circuit breakers or fused switches	0	YES	YES
Working on control circuits with exposed energized parts, over 120 volts			
600-volt-class Motor Control Centers	2*	YES	YES
600-volt-class switchgear (with power circuit breakers or fused switches)	2*	YES	YES
Other Tasks			
Reading panel meters while operating meter switches	0	NO	NO
Removing/installing other equipment			
Starter "buckets" for 600-volt-class motor control centers	3	YES	NO
600-volt-class revenue meters	2*	YES	NO
Covers or cable troughs for 600-volt-class revenue meters	1	NO	NO

Adopted from Table 130.7(c)(15(a)), NFPA 70E 2012 Edition.

Once the hazard/risk category has been identified, check requirements for Protective Clothing and Personnel Protective Equipment (PPE) when working on or near energized equipment within the flash protection boundary (**refer to TABLE 3**). These PPE requirements protect against electric shock and incurable arc-flash burns. They do not protect against physical injuries from arc blasts.

TABLE 3 - PROTECTIVE CLOTHING AND PERSONNEL PROTECTIVE EQUIPMENT (PPE)

HAZARD / RISK CATEGORY	Protective Clothing	PERSONAL PROTECTIVE EQUIPMENT (PPE)	MINIMUM ARC RATING (cal/cm^2)
0	Non melting or untreated Natural Fiber	Cotton Overalls	**0**
	FR Protective Equipment	Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather gloves, as needed[1]	
1	FR Clothing	Arc rated long sleeve shirt Arc rated pants Arc rated coveralls[2] Arc rated face shirt or arc flash suit hood Arc rated jacket, parka or rainwear (AN)	**4**
	FR Protective Equipment	Hard Hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather gloves[1] Hard Soled Shoes (AN)	
2	FR Clothing	Arc rated long sleeve shirt Arc rated pants Arc rated coveralls[3] Arc rated face shirt or arc flash suit hood[4] Arc rated jacket, parka or rainwear (AN)	**8**
	FR Protective Equipment	Hard Hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather gloves[1] Hard Soled Shoes	
2*	FR Clothing	Arc rated long sleeve shirt Arc rated pants Arc rated coveralls[3] Arc rated arc flash suit hood[7] Arc rated jacket, parka or rainwear (AN)	**8**
	FR Protective Equipment	Hard Hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Leather gloves[1] Hard Soled Shoes	
3	FR Clothing	Arc rated long sleeve shirt[5] (AR) Arc rated pants[5] (AR) Arc rated coveralls[5] (AR) Arc rated arc flash suit jacket[5] (AR) Arc rated arc flash suit pants[5] (AR) Arc rated jacket, parka or rainwear (AN)	**25**
	FR Protective Equipment	Hard Hat FR hard hat liner (AR) Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) V-rated gloves[1] Hard Soled Shoes	

HAZARD / RISK CATEGORY	Protective Clothing	PERSONAL PROTECTIVE EQUIPMENT (PPE)	MINIMUM ARC RATING (cal/cm^2)
4	FR Clothing	Arc rated long sleeve shirt[6] (AR) Arc rated pants[6] (AR) Arc rated coveralls[6] (AR) Arc rated arc flash suit jacket[6] (AR) Arc rated arc flash suit pants[6] (AR) Arc rated arc flash suit hood[6] Arc rated jacket, parka or rainwear (AN)	**40**
	FR Protective Equipment	Hard Hat FR hard hat liner (AR) Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) V-rated gloves[1] Hard Soled Shoes	

Adopted from Table 130.7(c)(16), NFPA 70E 2012 Edition.

Notes:

AN = As needed (optional) **AR** = As required **SR** = Selection Required

[1] If rubber insulated gloves with leather protectors are required by **TABLE 2**, additional leather or arc-rated gloves are not required. The combination of rubber insulating gloves with leather protectors satisfies the arc flash protection requirement.
[2] Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR Shirt and FR Pants.
[3] Alternate is to use FR coveralls (minimum arc rating of 8) instead of FR Shirt and FR Pants.
[4] A face shield with a minimum arc rating of 4 for Hazard/Risk Category 1 or a minimum arc rating of 8 for Hazard/Risk Category 2, with wrap around guarding to protect not only the face, but also the forehead, ears and neck (or alternatively, an arc-flash rated suit hood) is required.
[5] An alternate is to use a total FR clothing system and hood, which shall have a minimum arc rating of 25 for Hazard/Risk Category 3.
[6] The total clothing system consisting of FR shirt and pants and/or FR coveralls and/or arc flash coat and pants and hood shall have a minimum arc rating of 40 for Hazard/Risk Category 4.
[7] Alternate is to use a face shield with a minimum arc rating of 8 and a balaclava (sock hood).

XI. INSULATED TOOLS AND PPE

- Only V-rated tools and insulated equipment shall be used within the Limited Approach Boundary of exposed energized parts.
  - V-rated tools shall be designed and constructed for the environment to which they are exposed and the manner in which they are used.
  - Fuse or fuse holder handling equipment, insulated for the circuit voltage, shall be used to remove or install a fuse if the fuse terminals are energized.

- V-rated tools shall be protected from damage and degradation of the integrity of the insulation.
  - Rubber insulating equipment must be stored in an area protected from light, temperature extremes, excessive humidity, ozone, and other substances and conditions that may cause damage.

    - Insulating equipment found to have defects that might affect its insulating properties must be removed from service until testing indicates that it is acceptable for continued use.
    - Where the insulating capability of protective equipment is subject to damage during the use, the insulating material shall be protected by an outer covering of leather or other appropriate material.

- Ropes and hand lines used near exposed energized parts shall be nonconductive.
- Portable ladders used for electrical work shall be nonconductive.

XII. INSPECTION OF TOOLS AND PPE

- Insulating equipment must be inspected for damage before each day's use and immediately following any incident that could have caused damage.
- An air test must be performed on rubber insulating gloves before each use.
- Rubber insulating equipment must be tested according to the schedule contained in **TABLE 5**.

TABLE 5 - INSPECTION SCHEDULE FOR RUBBER INSULATING EQUIPMENT

TYPE OF EQUIPMENT	WHEN TO TEST
Line hose	If insulating value is suspect
Covers	If insulating value is suspect
Blankets	Before first issue and every 12 months thereafter (*)
Sleeves	Before first issue and every 12 months thereafter (*)
Gloves	Before first issue and every 6 months thereafter (*)

(*) If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

XIII. TRAINING

Arc Flash training will provide workers the knowledge and understanding of the existence, nature, causes, and methods to prevent electrical hazards. Some of the topics will include:

- Arc flash awareness
- Standards and codes
- Understanding of arc flash quantities
- Selection and use of appropriate PPE
- Reading and following warning signs and labels
- Methods to reduce risk while working on live exposed parts
- Arc flash hazard assessment
- Documentation

XIV. RECORDKEEPING

Training records will be maintained by WFBMC EH&S.

Rubber Insulated Equipment test records will be maintained by WFBMC Engineering.

XV. PROGRAM REVIEW

The Arc Flash Program shall be reviewed by WFBMC Environmental Health and Safety and WFBMC Engineering annually.

DATE	INDIVIDUAL	REVIEW TYPE
July 10, 2012	C. Caskey / L. Shore / S. Holladay	Annual

APPENDIX A – JOB BRIEFING AND PLANNING CHECKLIST

IDENTIFY The hazards The voltage levels involved Skills required Any “foreign”, secondary source, voltage source Any unusual work conditions Number of people needed to do the job The shock protection boundaries The available incident energy Potential for arc flash (conduct a flash-hazard analysis) Flash protection boundary
ASK Can the equipment be de-energized? Are back feeds of the circuits to be worked on possible? Is a “standby person” required?
CHECK Job plans Single line diagrams and vendor prints Status board Information on building and vendor resources is up to date Safety procedures Vendor information Individuals are familiar with building
KNOW What the job is? Who else need to know? – Communicate Who is in charge?
THINK About the unexpected event. what if? Lock – tag – test – try Test for voltage – first Use the right tools and equipment, including PPE Install and remove grounds Install barriers and barricades What else..?
PREPARE FOR AN EMERGENCY Is the standby person CPR trained Is the required emergency equipment available? Where is it? Where is the nearest telephone? Where is the fire alarm? Is confined space rescue available? What is the exact work location? How is the equipment shut off in an emergency? Are the emergency telephone numbers known? Where is the fire extinguisher? Area radio communications available?